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Inhaler and Nebuliser Technique for Individuals with a Learning Disability

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Abstract

Health carers providing support to individuals requiring an inhaler or nebuliser need to know how to use, monitor and assess inhaler technique effectively.

Many individuals requiring an inhaler will often have poor technique which results in an insufficient amount of medication being inhaled into the lungs, consequently the medication having less impact on treating the condition it is prescribed for. In order to ensure individuals have adequate inhaler technique, their performance needs to be reviewed and monitored by an appropriately trained health care professional to ensure its effectiveness.

Poor inhaler technique can lead to poor management of their respiratory condition, increasing symptoms, reducing quality of life, increasing the need to use primary/secondary care services and growing the cost to treat the disease.

This article will demonstrate how to use an inhaler and nebuliser successfully and consider some of the challenges this skill can have with individuals with a Learning Disability (LD) due to their cognitive impairment and pre-existing conditions. It will also identify some of the other different devices and assessment tools available. It will explore assessment/review methods to help ensure the individual is taking the inhaler/nebuliser successfully.

Keywords

Learning Disability, Intellectual Disability, Inhaler, Technique, Nebuliser, Clinical Skill, Respiratory Conditions, Self-Management, Assessment, Nurse,

Aim and intended learning outcomes

The aim of this article is to demonstrate how to use an inhaler and nebuliser effectively and safely, with a specific focus on individuals with a Learning Disability (LD). Supporting the Nursing and Midwifery Council (NMC) The Code especially in relation to point 18 *“Advise on, prescribe, supply, dispense or administer medicines within the limits of your training and competence”* (p 5 NMC 2015).

After reading this article the reader will be able to:

- Administer an inhaler and nebulisers effectively;
- Recognise that different inhalers require different techniques to administer effectively;
- Assess that an individual has administered an inhaler or nebuliser successfully;
- Promote self-administration of inhalers in individuals with LD
- Contemplate some of the adjustments required for an individual with LD;
- Use inhaler assessment tools to assess if an individual is using the inhaler correctly;
- Ponder a change of inhaler type or additional equipment to help ensure optimisation of the medication;
- Consider if an individual with a LD requires closer monitoring to promote self-management;

Introduction

Heslop et al (2013) ‘Confidential Inquiry into the Deaths of People with Learning Disability (CIPOLD)’ recommended that adults with LD to be considered a high-risk group for deaths from respiratory problems. Having the insight of the additional challenges these health problems present for individuals with a LD who are already known to be a high-risk group experiencing co-morbidities arising from long-term conditions (Public Health England (PHE) 2016) is of paramount importance for the health carer. In achieving a therapeutic goal promoting self-care and independence (Aldridge 2010) it is important to involve the individual with LD in the choice of inhaler and select a device they find easy to use (Davis, 2016). ‘Reasonable adjustments’ (*Equality Act 2010*; PHE 2017) should be anticipated, the

individual with a LD may require additional support and guidance to select their device and develop an effective technique; 'Patient friendly' monitoring can help manage symptoms (Stothard, 2017). The individual is likely to benefit from familiarisation/desensitisation to the equipment and procedures, preparation is likely to reduce the individual's anxiety or fear and increase positive outcomes for all involved.

Inhalers are one the most common medication prescribed in the United Kingdom (UK), the Prescription Cost Analysis (NHS Digital 2017) states that over £1 billion is spent on the respiratory system medication alone, with inhalers making the largest percentage of money spent on this system. Beclometasone dipropionate (a corticosteroid inhaler) accounting for the most amount of money the National Health Service (NHS) England spends on a single drug, costing over £174 Million a year (NHS Digital 2017). Two of the most common diseases that require inhalers and nebulisers for treatment include asthma and Chronic Obstructive Pulmonary Disease (COPD). Currently around 5.4 million people are receiving treatment for asthma in the UK (Asthma UK 2018) and an estimated 1.2 million are diagnosed with COPD in the UK British Lung Foundation (BLS) (2018). A significant percentage of people with asthma and COPD will also have a LD as Mencap (2013) reports that 1.5 million people have a LD within the UK, an estimated 2% of the UK population.

A report by Allan et al (2012) highlights individuals with LD who smoke are twice as likely to have asthma and more than half of women with LD and asthma also have associated problems with obesity (a risk factor for poorly controlled asthma). The report (Allan et al 2012) also indicates that respiratory disease is the leading cause of death for people with LD and is responsible for around half of all deaths among people with LD this is much higher than for the general population diagnosed with respiratory disease.

It has been highly reported that people with LD experience significant health inequalities compared to the general population, with higher levels of unmet needs PHE (2016) delays in access to diagnosis, investigations or specialist referrals (Mencap 2007, 2012) resulting in a higher incidence of untimely deaths (Mencap 2012; Heslop et.al 2013; PHE 2016).

According to Price et.al. (2013) despite the high cost of inhalers, the frequency of prescription review, and opportunity for patient education on inhaler use, many individuals

still have poor inhaler technique. Global Initiative for Asthma (GINA) (2018) highlights that between 70-80% of people with asthma are unable to use their inhaler correctly with similar figures reported in those with COPD. Poor inhaler technique leads to poor disease control, reduced quality of life (QoL), increased emergency admissions and higher treatment cost (AL-Jahdali et al. 2013; Stothard 2017). Worryingly research has also suggested that many health care staff have poor assessment technique when teaching/assessing patient's inhaler technique and unable to perform or talk through the critical steps of using an inhaler (Fink & Rubin 2005). As a health carer, supporting individuals with LD it is essential to know how to administer an inhaler and nebuliser effectively. Being able to deliver, assess and monitor inhaler technique effectively, suggesting additional equipment/inhaler type, and being present during outpatient appointments could all help to ensure the medication is delivered effectively thus improving symptoms and QoL (Global Initiative for Chronic Lung Disease (GOLD) 2018; GINA 2018).

Time out 1

Review the National Institute for Health and Care Excellence (NICE) (2017) Asthma: diagnosis, monitoring and chronic asthma management [online]

<https://www.nice.org.uk/guidance/ng80>

Are you implementing this guidance in your own practice? List three improvements that could be made to your practice as a result of reading this guidance. Consider how you could disseminate this information to your colleagues.

Depending on the clinical need of the LD individual, you may also wish to review a different clinical guideline <https://www.nice.org.uk/guidance/conditions-and-diseases/respiratory-conditions>

Inhaler

There are many different inhalers available; the two main types of inhalers are Metered Dose Inhalers (MDI) and Dry Powder Inhalers (DPI). Within these two types of inhalers, there are various brands and versions depending on the manufacture, drug and pharmaceutical company. MDI and DPI each require a slightly different inhaler technique in order to administer the medication effectively. It is worth remembering that certain drugs may only be available in MDI or DPI form British National Formulary (BNF) (Joint Formulary Committee, 2018).

Metered Dose Inhalers (MDI)

MDI are the most common type of inhaler (Image A) used in practice and often the cheapest method of delivering the medication (Joint Formulary Committee, 2018). MDI dispense medication through an aerosol spray or mist, through each push of a canister a measured dose of medication is produced (Perry, Potter & Elkin 2012). This type of inhaler requires a degree of dexterity as the individual needs to be able to inhale at the same time the medication is being delivered (canister is pushed) (Lynes 2007). The individual needs to ensure that they are inhaling slowly and deeply to ensure that the drug goes to the peripheral airways instead of the mouth or throat (Capstick & Clifton 2012). They also need to understand the importance of following this process correctly in order to optimise the medication delivery. Inhalers need to be cleaned regularly following the manufacturer's instructions.

Image A

Example of MDI

Time out 2

Please watch this short video on how to take a MDI, this will help to reinforce the information you have read. [Asthma UK \(2012\) How to take a Metered Dose Inhaler](https://www.youtube.com/watch?v=FqztOZLqFhE)
<https://youtu.be/FqztOZLqFhE>

As you view the video consider how you would explain and demonstrate this technique to an individual with LD.

Identify any reasonable adjustments which may be required (see Box 1).

Identify the role of the family carer, how this might differ from that of a paid carer?

Breath-Actuated Inhaler (BAI)

Breath-Actuated Inhaler (BAI) see (Image B) is a different form of the MDI. The medication comes in an aerosol canister however this is not visible, and the individual cannot push the canister down. When the patient inhales a mechanism automatically realises the drug, this means inhalation and actuation coincide with each other (Currie 2011). This is useful as the dexterity is not as essential, as with the MDI, however the individual still needs to focus on the strength of inhalation to ensure it reaches the lungs adequately (Newman et al. 1991). BAI have been demonstrated to improve the deposition of aerosol within the lungs for patients who have difficulty coordinating Inhalation when previously using MDI (Capstick & Clifton 2012). A slow and steady inhalation is still required to ensure optimisation of medication.

It may be worth considering swapping to this form of inhaler if the individual is finding the MDI challenging.

This form of inhaler is much more expensive than the MDI (Joint Formulary Committee, 2018).

Image B

An example of a BAI inhaler

Time out 3

Please watch these two short videos on how to take two different types of BDI, to help reinforce the information you have read.

Asthma UK (2012) [How to take an Easi-Breathe inhaler](https://youtu.be/Qf-yHFEq8IU) - <https://youtu.be/Qf-yHFEq8IU>

Asthma UK (2012) [How to take an Autohaler](https://youtu.be/5q7FpntKnm8) - <https://youtu.be/5q7FpntKnm8>

As you view these videos consider how you would explain and demonstrate these techniques to an individual with LD.

Dry Powder Inhalers (DPI)

DPI (Images C, D, E, F,) medication comes in a dry powder different to that of the MDI. The main advantage of DPI is that they do not require coordinated activation (Bonni & Usmani 2015). Therefore, use is similar to that of the BAI. The mechanism of the inhaler works differently to the BAI.

The major differences to that of the MDI are that in order for this type of inhaler to work effectively, the medication needs to be inhaled quickly and deeply and the medication needs to be made active by the individual in order for it to be delivered. DPI requires much higher inhalation flows than MDI, and not using a forceful and deep inspiration is a common critical issue with DPI (Bonni & Usmani 2015). Depending on the type of DPI activating the medication may involve twisting, clicking or manually adding the medication to the inhaler. The variation in techniques may cause some additional confusion to the individual with a LD (especially if using different types of DPI & MDI). The medication is drawn out of the blister or capsule by the user's inhalation, so individuals will need to be able to take a quick and deep breath in to pull the medication out of the carrier (Scullion 2017).

For this type of inhaler, the medication is often more expensive compared to the MDI (Joint Formulary Committee, 2018).

Image C

Single dose of DPI inhaler (example)

Image D, E, F,

Multi-dose DPI inhalers (example)

Time out 4

Please watch these two short videos on how to take two different types of DPI. This will help reinforce the information you have read.

Asthma UK (2012) [How to take an Accuhaler inhaler https://youtu.be/0mgggfL0zjw](https://youtu.be/0mgggfL0zjw)

Asthma UK (2012) [How to take an Turbohaler inhaler https://youtu.be/2_6DvPwZj2s](https://youtu.be/2_6DvPwZj2s)

As you view these videos consider how you would explain and demonstrate these techniques to an individual with LD.

Revisit 'Time out 2'

Additional Equipment

Additional equipment can be attached to inhalers to help improve technique and efficacy, for instance a lever can be added for individuals who struggle to push the aerosol down (MDI). These are often added for individuals who have a physical condition such as rheumatoid arthritis.

Additional assessment devices are also available that can help ascertain if the individual is inhaling too softly or too strongly; this equipment can be useful to help promote the correct strength of inhalation for the individual using a MDI. Placebo inhalers are also available to help assess and improve technique and can be useful when training and assessing (Image G); a lack of placebo inhalers in clinical practice is often a barrier to provide adequate inhaler technique training GOLD (2018).

Image G

Placebo MDI inhaler

Spacers can also be added if an individual has poor coordination when using a MDI inhaler. As part of the assessment process it is necessary to understand and utilise these additional equipment pieces as it will help to improve optimisation of the medication.

Spacers

Spacers (Images H, I, J, K,) are useful if an individual has poor dexterity or difficulty with the coordination when using a MDI. A spacer may be a useful additional equipment piece and is often used with children, the elderly and people with physical disability or LD (Sanchis et.al 2016).

The medication is delivered into a valued chamber acting as a temporary reservoir before inhalation this helps to slow the delivery of the medication (White 2015). The medication is delivered into the spacer and the individual does not need to focus on inhalation at the same time as the canister being pushed, thus reducing the coordination required. There are also two different breathing techniques (single breath or multiple breaths) that can be used with a spacer however this still requires a slow and steady inhalation; the individual may find one breathing technique easier than the other. Certain brands of spacer will whistle if the inhalation is too quick, this audible reference may be useful when promoting successful inhaler technique. A mask is sometimes added to the spacer if the individual lacks the coordination to make a seal around the inhaler mouthpiece. This is often used with young children and again maybe suitable to consider with individuals with LD. Spacers need to be cleaned regularly according to the manufactories recommendation.

Image H, I, J, K.

Types of spacers.

Volumatic

AeroChamber Plus

Able Spacer

Antistatic holding chamber

Time out 5

Please watch these short videos on how to use a spacer including different breathing techniques and using them on children, to help reinforce the information you have read.

Asthma UK (2012) [How to use a Small Volume Spacer](https://youtu.be/fZPS_w54rfY) https://youtu.be/fZPS_w54rfY

Asthma UK (2012) [How to use a Large Volume Spacer \(single breath technique\)](https://youtu.be/5-HT9mt8GG0)
<https://youtu.be/5-HT9mt8GG0>

Asthma UK (2012) [How to use a Large Volume Spacer \(multiple breath technique\)](https://youtu.be/yYscA7XkfTc)
<https://youtu.be/yYscA7XkfTc>

Asthma UK (2014) [How to use a Small Volume Spacer with a child](https://youtu.be/RKj9SzU6SV4)
<https://youtu.be/RKj9SzU6SV4>

Asthma UK (2014) [How to use a Large Volume Spacer with a child](https://youtu.be/1ERSL2UyCNO)
<https://youtu.be/1ERSL2UyCNO>

Asthma UK (2014) [How to use a Large Volume Spacer \(with a mask for a child\)](https://youtu.be/SIbYtZJ3U7U)
<https://youtu.be/SIbYtZJ3U7U>

Nebuliser

Nebulisers can be used through a compressor (Image L), an ultra-sonic or through piped O₂ or air (often only available in secondary care). Nebulisers use oxygen, compressed air or ultrasonic power to break up medical solutions into fine aerosol mist that can be directly inhaled from the mouthpiece/mask Curie (2011). A nebuliser normally takes around 5-10 minutes (British Thoracic Society (BTS) 1997; NICE 2018) however it can be challenging to determine when to stop the nebuliser. Informing the user that nebulisation therapy usually continues until the volume left in the nebuliser is so low that the nebuliser ceases to function continuously and begins to "splutter" (Boe *et al* 2001) this is the sign to turn the nebuliser off. Often used in more acute settings, nebulisers often use the same drug as an inhaler but at larger dosages, if an Individuals unable to coordinate an inhaler effectively and medication that is required that is only available via this route i.e. nebulised antibiotics (Blackler, Jones & Mooney, 2007).

If an individual does not have the dexterity to take an inhaler a nebuliser may be the only option available. However, currently there is no evidence that shows nebuliser therapy is superior to inhalers if inhalers are used correctly (GOLD 2018). According to Davis (2016), nebulisers should be prescribed to individuals with LD with social/visual attentiveness deficits or for whom inhalers have proved unsuccessful. However their previous study (Davis et al 2015) found that paid care givers didn't believe they have had appropriate training in the use of nebulisers. It is therefore imperative that carers are provided with appropriate training and support individuals in the correct usage of their nebuliser.

Nebulisers can be delivered though a mouthpiece or face-mask (Image M & N). Face masks are used more frequently used in secondary care if the patient is acutely ill as it is more likely to ensure the patient receives the medication.

According to Kelly and Lynes (2011) research has shown that the nebuliser equipment is often not cleaned correctly after use resulting in bacteria growing within them. This will put the patient at direct risk of respiratory infections as the contaminated vapour will be breathed directly into the lungs. Therefore, cleaning the equipment adequately after use is an essential part of the process. This process involves cleaning with warm soapy water and being left to air dry, and it should be performed at least daily if the nebulisers are used regularly (Kelly and Lynes 2011) Nebulisers also require to be serviced regally to ensure their effectiveness.

Image L

Air Compressor

Image M

Nebuliser face mask

Image N

Nebuliser mouthpiece

Time out 6

Please watch this short video on how to take a use a nebuliser, to help reinforce the information you have read. It also contains an inhaler and spacer consultation for your reference. The second video demonstrates how to clean your nebuliser.

Oxford Medical Education (2012) [Inhaler and Nebuliser Explanation](#)

<https://youtu.be/hjdIyyC8T-E>

How to Clean a Nebulizer American Lung Association (2015) [How to Clean a Nebulizer](#)

<youtube.com/watch?v=HFT4v7EhLUw>

As you view the videos consider how you would explain and demonstrate the techniques to an individual with LD.

Identify any reasonable adjustments which may be required (see Box 1).

Identify the role of the family carer, how this might differ from that of a paid carer?

Inhaler technique

Below is a basic 7 steps technique checklist (Table 1). This is relevant to all inhalers types. This is a simple and easy checklist to follow when teaching/assessing inhaler technique and can be used for both MDI & DPI. However, the type of inhalation is different depending on whether the inhaler is a MDI or DPI.

Table 1: Inhaler Technique checklist

Inhaler technique checklist
1. Prepare the device (e.g. remove the mouthpiece cover, open the device, hold the inhaler upright)
2. Prepare the dose (e.g. shake all aerosols and load dose for DPIs)
3. Breathe out gently as far as is comfortable (not into inhalers)
4. Put the mouthpiece in the mouth and close the lips around it
5. Breathe in: Check co-ordination of breathing and actuation of MDI Think about the type of inhaler device - is it an aerosol device or DPI? Breathe in slowly and steadily for all aerosol devices (including through a spacer device). Breathe in quickly and deeply for all DPIs
6. Remove inhaler from the mouth and hold breath for ten seconds
7. Repeat dose (if applicable), replace mouthpiece cover or close device. (Murphy 2016, p.9)

Annual Reviews

In order to determine if an inhaler/nebuliser is being taken effectively it is essential that this is reviewed and monitored correctly. This assessment/review is usually undertaken by a practice nurse during a yearly review of the condition for example within an Asthma/COPD clinic and forms part of the individuals 'Annual Health Check' (NHS England, 2017; Royal College of General Practitioners (RCGP) n.d.). NICE (2013) quality standard stipulates that an individual with asthma receives a structured review each year. However, despite yearly assessment the individual often reverts back to poor inhaler technique within a short period of time (Price et.al. 2013). This poor practice is likely to be more prevalent with individuals with a LD where retention of information regarding technique and dexterity in the skills is compromised. To assist with support and continuity of care it is imperative that the

intervention is clearly and accurately recorded in the individual's health action plan (RCGP n.d.). The nurse can help to promote adequate inhaler technique, and this is a vital part of the yearly review. Please see the table below (Table 2) for some common inhaler errors to be aware of.

Table 2: Common inhaler technique errors

Common inhaler technique errors
Failure to co-ordinate actuation and inhalation
Inadequate or no breath hold after inhalation
Too rapid inspiration / not inhaling forcibly
Inadequate shaking / mixing before use
Cold Freon effect (the initial reaction to the cold blast of MDI aerosol on the back of the throat can result in the patient aborting the inhalation process)
Actuation at total lung capacity / Not exhaling to residual volume before inhaling
Multiple actuations during single inspiration
Inhaling through nose during actuation
Exhaling during activation / through the mouth piece
Putting wrong end of inhaler in mouth
Holding device in wrong position / incorrectly
Exhaling into the mouth piece after inhalation (Chrystyn & Price, 2009)

According to Stothard (2017) study an asthma outpatient department acknowledged the additional challenges individuals with LD face and increased the outpatient visit from 10 minutes to 30 minutes focusing on a tailored education management programme and adherence to treatment. Over a 10-month period of this new intervention being implemented accessed emergency care services dropped by 25% (Stothard 2017); their intervention demonstrates clear benefits and highlights that individuals with LD may require additional time and support to promote self-management.

Time out 7

Read the article by Price et al (2013) Inhaler competence in asthma: Common errors, barriers to use and recommended solutions. *Respiratory Medicine*. 107 (1) 37-46.

While viewing 'Table 1' in the article, identify the critical errors and adjustments which may be required when supporting a person with LD.

Please use the link below as an example of an inhaler checklist that is being used in clinical practice.

NHS Liverpool Clinical Commissioning Group (2013) [Inhaler Technique Checklist](#)

http://psnc.org.uk/liverpool-lpc/wp-content/uploads/sites/117/2016/06/Inhaler_Technique_Checklist.pdf

Could you use this or something similar when assessing the inhaler technique of individuals with LD?

What do you use to review nebuliser technique?

Case Study

Jim attends your asthma clinic today, this is the first time he has attended the asthma clinic. Jim has had a recent hospital admission for pneumonia and was treated with intravenous antibiotics. During this admission Jim was diagnosed with asthma and was prescribed MDI inhalers. Jim has made a full recovery following acquiring pneumonia; on discharge the medical staff have indicated that Jim requires a regular review of his asthma and have referred this to the primary care team.

Jim is a 28-year man with a moderate level of learning disability and autism, he requires support to maintain his activities of daily living (ADL). Jim lives with two friends, who both have LD. Jim and his friends employ a small team of carers to support them. One of Jim's carers attends the clinic with Jim. Jim is unsure about his asthma and struggles to describe his symptoms. The carer states Jim appears to get short of breath on exertion and his symptoms appear worse during the summer months.

He has no other past medical history and does not smoke or drink alcohol. You assess his inhaler technique and Jim is unable to use his MDI effectively despite promoting and appears confused as to what his inhalers are intended for.

Answer the following from this case study: (You may find it beneficial to review some of the resources and your responses during your time out activities).

1. How would you assess Jim inhaler technique?
2. How would you teach Jim accurate inhaler technique?
3. What inhaler and additional equipment do you feel could improve Jim's inhaler technique?
4. How would you review Jim regarding his inhaler technique?
5. What advice would you offer Jim and his care team?
6. What factors would contribute towards Jim being more at risk of not managing his asthma effectively?

Conclusion

Individuals with LD experience significant health inequalities compared to the general population with higher levels of unmet needs and delays in access to diagnosis, investigations or specialist referrals (Heslop et.al. 2013; PHE, 2016). With recent high-profile cases highlighting that individuals' having a long-term condition alongside a LD the care is often substandard (Heslop et.al.2013; MENCAP 2013; PHE 2016). The need to ensure effective inhaler technique is paramount. It is essential as a nurse supporting an individual with a LD to have the knowledge and understanding of how inhalers are used, assessed and monitored correctly, coinciding with the NMC code. This will help to ensure optimisation of the medication thus helping to reduce clinical symptoms, improve QoL and reduce the need to attend primary and secondary care services (GINA 2108 & GOLD 2018).

By reading and carrying out the tasks & case study in this article the reader will understand how to deliver an inhaler correctly for MDI, DPI and nebulisers. The reader will have insight into the additional challenges this skill requires for individuals with LD. The reader will be able to assess and monitor inhaler technique accordingly and consider when additional equipment or change of inhaler type might help improve optimisation of the medication.

Reasonable adjustments:

Public Health England (2017) Reasonable adjustments: a legal duty (Guidance) [Online]

Available from: <https://www.gov.uk/government/publications/reasonable-adjustments-for-people-with-learning-disabilities/reasonable-adjustments-a-legal-duty>

NHS England (no date) Reasonable adjustments [Online]. Available from:

<https://www.england.nhs.uk/learning-disabilities/improving-health/reasonable-adjustments/>

Asthma UK – Easy read resources -

<https://www.asthma.org.uk/advice/resources/#easyread>

Explore the resources in this site and review them for use in your own practice

think about how you will share these resources with your colleagues.

What 'Easy Read' resources do you have available for use in your practice area?

What equipment will you require to demonstrate technique?

Try using the term "easy read" to search for other online resources.

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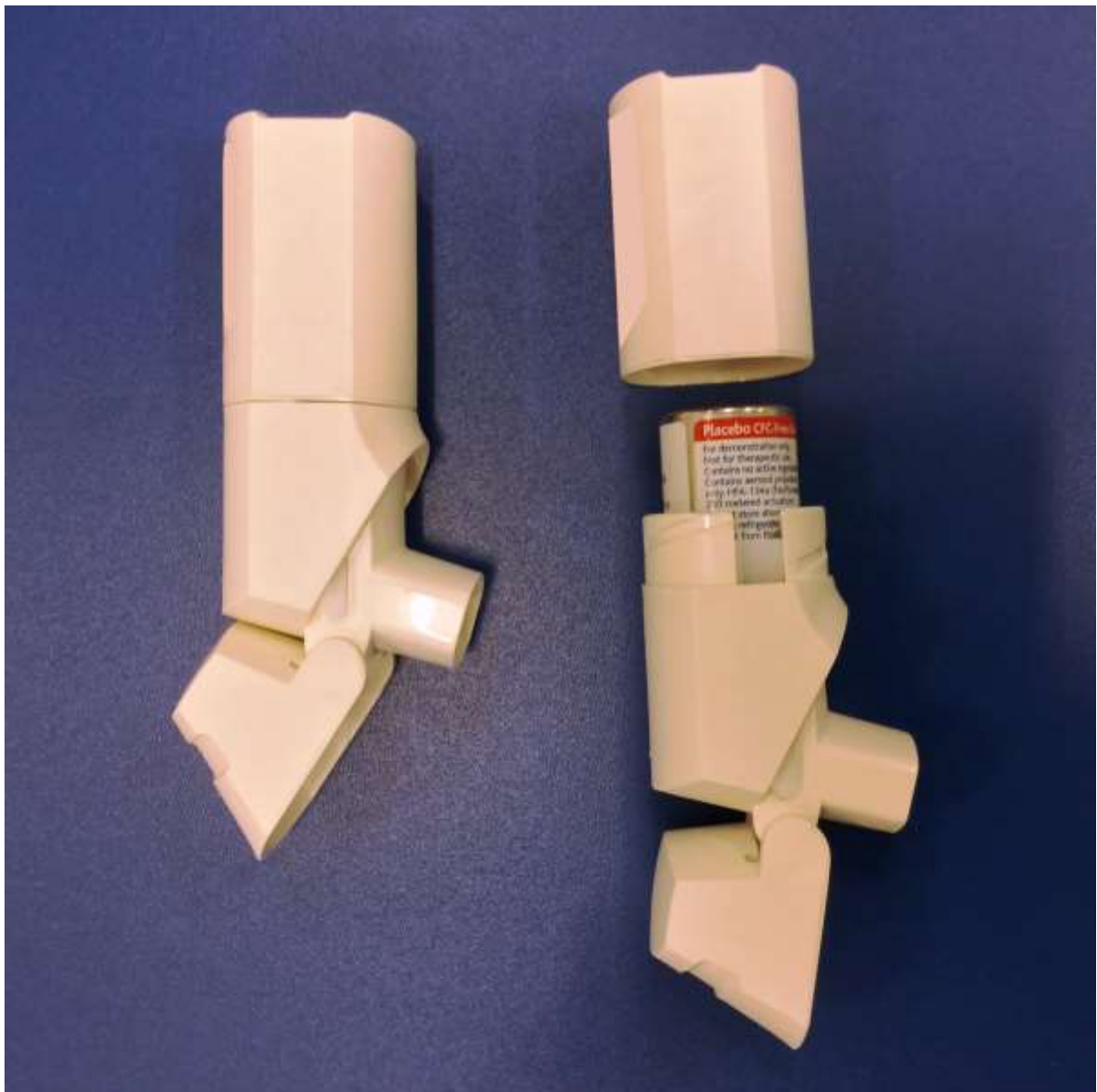
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Image A



MDI

Image B



BAI

Image C



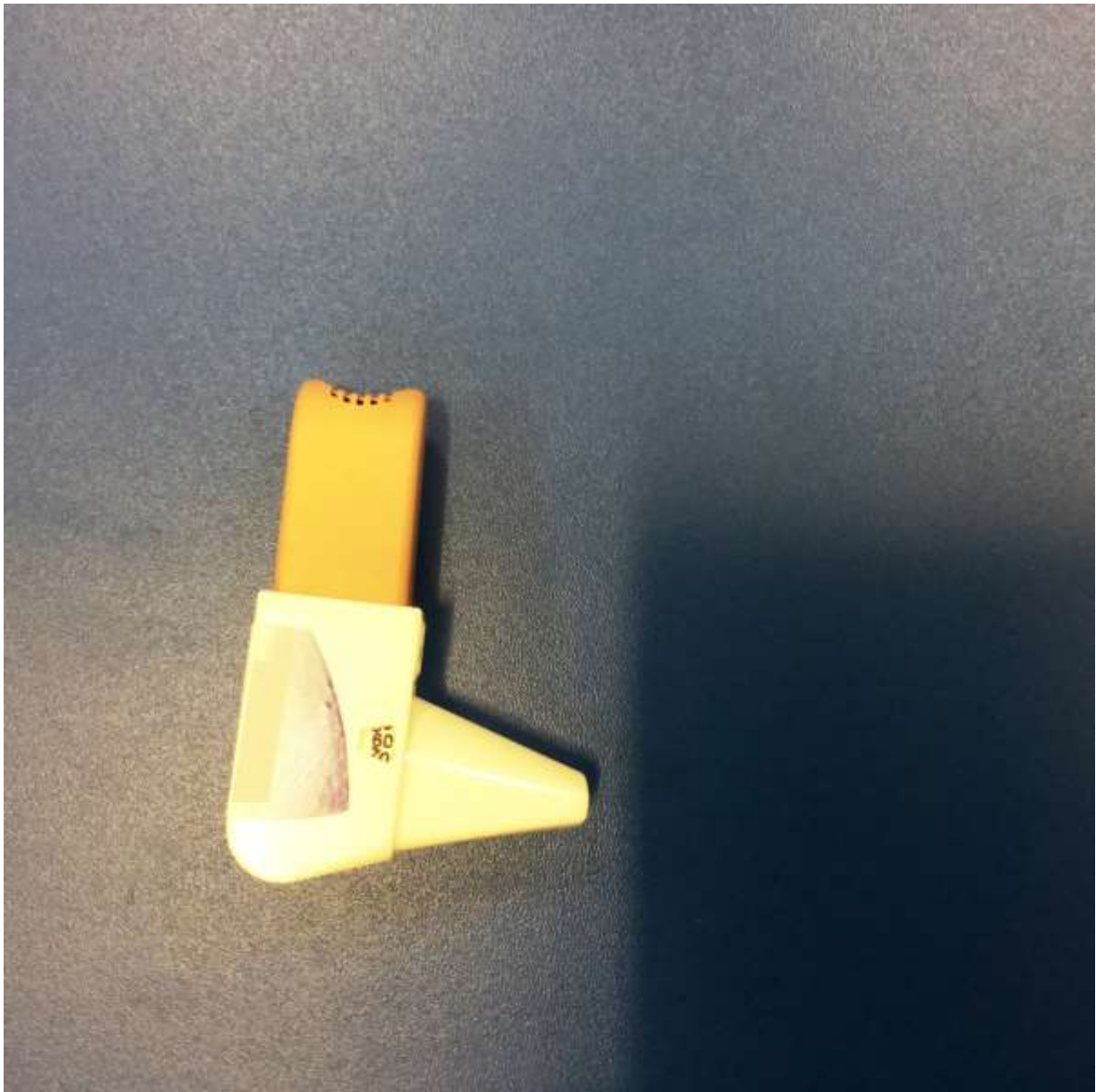
Single dose DPI

Image D



Multi-dose DPI a.

Image E



Multi-dose DPI, b.

Image F



Multi-dose DPI,c.

Image G



Placebo MDI

Image H



Volumatic

Image I



Able Spacer

Image J



AeroChamber Plus

Image K



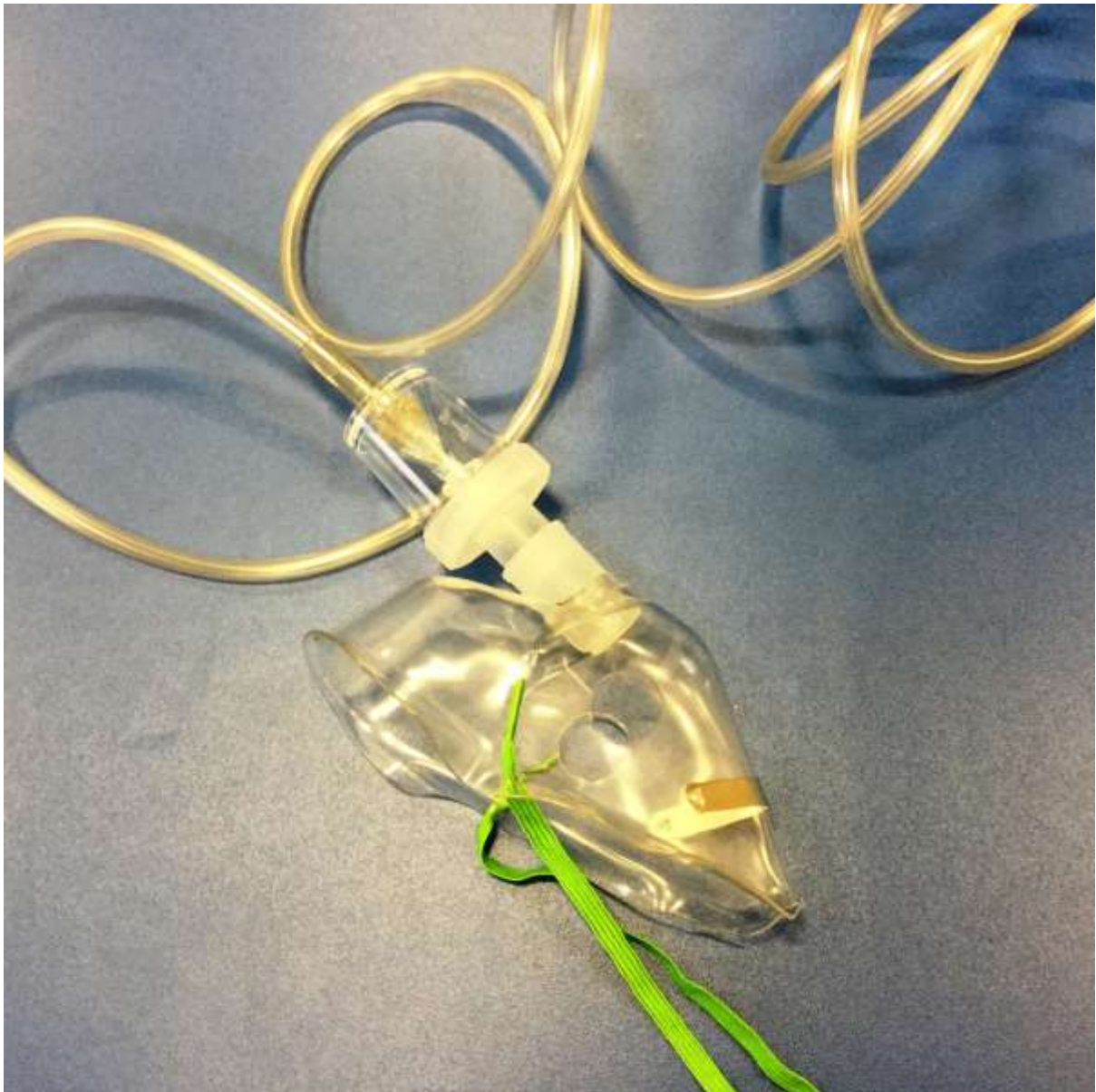
Antistatic Holding chamber

Image L



Air compressor

Image M



Face mask

Image N

